

# **European Conference on Floods**

## **Vienna (AT), 17<sup>th</sup>/18<sup>th</sup> May 2006**

Abstracts of presentations

<b>17<sup>th</sup> May 2006, Session 1</b>
<b>„The challenges – climate change, submerging land, sea level rising; first responses from coasts to mountains“</b>
<i>Prof. Dr. Wolfgang Stalzer / Mag. Werner Wutscher (AT)</i> Welcome/Introduction
<i>Prof. Dr. Axel Bronstert (PIK/UP)</i> “Climate change and its impacts on the water system”
<p>There are several indications that changes of our climate system have already influenced the hydrological cycle and the runoff behaviour of catchments, while the impact on hydrological extremes has been of particular interest during the recent years. However, it is at present rather uncertain how, how much and at which spatial scale the anthropogenic climatic changes are affecting the flood conditions of rivers.</p> <p>This contribution gives an overview of current perspectives on climate change. Then, a discussion on the specific impacts on the hydrological cycle with a special focus on river floods is presented. For regional assessment of climate change impacts, different downscaling approaches are summarised. The rather different projections of various GCM models are shown.</p> <p>The possible effects of climatic change on the water system are demonstrated by means of coupled climatic-hydrological modelling studies of different meso-scale river catchments. These catchments are located in different climatic and geo-morphological regions: the Thames in England, the Elbe in Czech Republic and Germany, the Rhine in Western Europe, including several sub-catchments, and the Pinios catchment in Greece. An outlook is given with respect to the flood directive recently proposed by the European Union.</p>
<i>MSc Sarah Nason - DEFRA (UK)</i> “Sea Levels rising, land submerging – UK’s response”
<p>The UK presentation addresses managing flood risk from the sea, particularly in England. It looks briefly at the factors behind increasing flood risk in future, such as climate change and socio-economic scenarios, and then addresses the development of flood risk management policy. The Government’s strategy is to apply a portfolio of responses based on national risk assessment. The development of the Thames Estuary flood risk management plan for the next 100 years is used as an example. Lastly, the impact of the proposed EU Directive on the UK’s flood risk management programme is briefly considered, concluding that a prescriptive approach applying to all waters in EU member states and not just to transboundary rivers could have an adverse effect through the diversion of scarce resources.</p>
<i>Dr. Eric Boessenkool (NL)</i> “The Protection of low lying territories against floods”
<p>Protection of low lying territories against floods: Water Safety in the Netherlands in the 21st century. Safety levels have never been so high but at the same time the probability and the potential consequences have increased, which has led to a changed mindset/and a search for a riskbased approach. I will give a short overview of current policy against flooding, followed by a description of recent technical and policy developments in The Netherlands, specifically the FLORIS project and 'Water Safety in the 21st century'. Developments in the Netherlands are also reflected in the general principles of the EU Action programme and Floods Directive.</p>

*Dr. eng. Pierpaolo Campostrini - CORILA (IT)*

“Past, present and future solutions of the city of Venice in regard to floods”

### **The history**

The tradition about the birth of Venice tells that the main reason for building a city in a tidal lagoon, was looking for refuge, under the pressure of repeated “barbarian” invasions of the V-VI century. It was not easy to leave in a lagoon, however the water was used by early Venetians not only as a safe shell, but also as a powerful way to rebuild the trade connections felt down with the decadence of the Roman Empire: problems were turned into opportunities and in the XIV century Venice was already one of the richest cities of Europe and a great power of the Mediterranean.

However, the winter storms often destroyed the fragile wood protections in the littoral zones, damaging houses and cultivations. “Acqua Alta” events (flooding) have always occurred in the millenary history of Venice, causing the contamination of the cisterns of rain water, made drinkable (and therefore very precious) by a sophisticate sand filtering.

In the XIV century the lagoon of Venice was quite different from today: rivers rich of sediments flowed in, and the number of sea inlets was bigger. The survival of Venice (commercial, military and even physical) was put in jeopardy by the siltation of the lagoon and, starting in the XIV century, the rivers moths were diverted out of the lagoon. In the 1794 the Republic completed the robust stone wall on the island in front of the sea, called “Murazzi”. To maintain the lagoon status while granting access to the port were always considered as absolute priorities. Around the XVIII century the political decadence of Venice brought to a halt the interventions in the lagoon. Over the past 150 years, by contrast, the lagoon was subject again to large modifications.

### **The position and the physical pressures**

Venice is placed almost at the top of the Adriatic Sea and for its position is subjected to high tide excursion, reflections of wave tides (seiches) and strong winds, which can “push” the seawater towards the coast line. Furthermore, the geology of the Po Plain cause a natural long term subsidence rate of 0,4-1,5 mm/yr. Added to this , the extraction of fresh water from wells for industrial purposed in the years 1950-1970 caused a loss of additional 11 cm. Summing the sea level rise and subsidence, in the last century a 23 cm loss of relative sea level occurred.

### **The flooding problem**

The flooding in Venice is due to two elements:

- a) the increase of the relative sea level, due to land subsidence and to the seal level rise (eustacy)
- b) fluctuations in the sea level, due to storm surges, sea surface oscillations (seiches), tides

The worse Acqua alta occurred the 4th November 1966, with almost 2 m over the mean sea level Venice is exposed both to extreme events, like that occurred in the 1966 (repetition interval:100-150 yr), and to frequent less severe events. The city is more fragile today because the same tide level which floods only 10% of the city in 1900, now affects a much larger area (80% of the city).

These events represent a thread for the buildings and for the city economy.

### **The solution framework**

With a specific law in 1973 Venice has been declared a Italy’s national interest, and in 30 years Italian taxpayers spent 8,5 billion Euro for its safeguarding, addressing four main targets:

- To reach hydraulic equilibrium
- To preserve environment from pollution
- To reinforce socio-economic vitality
- To safeguard the architectural patrimony

### **Coastal reinforcement**

The most important protected beach reconstruction projects ever implemented in Italy occurred in Venice, where 45km of coast line was restored, opposing erosion and protecting the lagoon and inhabited areas near the sea from sea storms. To date, work has involved a total of almost 45 km of coastline and about 9,8 million cubic metres of sand. In addition, 8 km of dune have been reconstructed.

### **Local defences**

Local defence measures have been realised in the narrow strip of land separating the lagoon and the sea. In the city a comprehensive plan of raising the pavements is ongoing. The most delicate and important one includes Piazza San Marco.

**Mobile flood barriers**

The MOSE system will prevent flooding by a temporary closure of the inlets. 18 floodgates at the Chioggia inlet 19 at the Malamocco inlet, 41 at the Lido lay normally on the sea bottom and rise up only when needed. The average inlet closure time is from 4 to 5 hours. Works started in 2003, are ¼ realised and will be ready in 2012. The total cost is 4,1 billion Euro, of which 1,5 already available and 1,0 spent.

**The EU Flooding directive**

The coast and coastal cities are important not only for their economic value, but also for the immense cultural heritage which characterizes Europe. The “cultural” dimension of flooding protection should be more clearly addressed in the Directive. The complex “Venice experience” is already “European” and is valuable for the EU Flood Action Programme and could help in policy definition and implementation. Research and Administration bodies work together for providing the best solution.

**17<sup>th</sup> May 2006, Session 2****“Living with floods in Europe - regional examples”**

*Justo Mora (SP)*

“Mediterranean Region – response Spain”

Abstract not yet delivered

*Norbert Sereinig (Interpraevent)*

“Alpine Region – response Austria”

**Introduction**

Modern natural hazard management can best be explained by means of the principle of the risk cycle, which begins with the event (disaster) and comprises disaster intervention, repair, reconstruction, prevention and measures of disaster preparedness. The objective is to improve and enhance society’s preparedness for future natural disasters. Provision of these security services requires the cooperation of experts of numerous technical disciplines and many public and private organisations. A task of natural hazard management is also to harmonise all relevant technical plans to serve the goal of protecting against natural hazards.

The protection against natural hazards has thus become a comprehensive task which cannot be managed by the state with its agencies and authorities alone. Also stakeholders – communities, carriers and utilities, the economy and, in particular, the individual citizen – must participate intensively in the precautionary measures and make an appropriate contribution thereto (Interpraevent Summit 2006, Austrian Statement).

**Challenges in the Alpine Region**

Due to the recent floods in 2002 and 2005 it was seen, that it is necessary to tune the strategies of the integrated flood management regarding to the different and specific situations of the European regions. As a small country within the Alpine Region, Austria has a special situation to deal with.

**Limited living space**

The limited living space in some regions of Austria leads severe conflicts between flood management and land use planning. If one sees that the usable settlement area for example in the Tyrol is only about 12 % of the total area, it is comprehensible that some parts of intensive utilization will occur in endangered areas.

**Rising damage potential**

Due to the mentioned limited living space it is clear that in the limited usable areas the damage potential will increase. “Living behind the dikes” is not only a problem in the lowland river areas. The recent flood events in Europe showed, that the amount of damages will increase escalated if the

design events of structural measures are exceeding.

#### Residual Risk

In this connection it is seen that we have also to deal with “rare events”. Due to the sudden increase of the damage potential, it is necessary to be prepared for “rare events”, for example by creating emergency spillways.

#### Short prewarning time

Due to the geomorphological situation in the Alpine Space, we have to deal with very short response times due to floods. Only floods along large rivers give us enough time to react. In small catchment areas we have to develop new instruments for advanced warning systems.

#### Climate Change

As well as in other parts of Europe we have to take into account the new challenges due to climate change. In the alpine Region we have not only to calculate with different probabilities of occurrence and changing peak flows but also to consider higher sediment load, higher snowlines and changed occurrence times (e.g. winter).

#### Risk awareness

Due to the higher mobility of people and the changing risk perception (“no risk no fun”), it is necessary to keep the dangers in mind.

#### **Strategy of Austria**

Experiences that can be gained from coping with natural disasters constitute an important basis for a better preparation of the society for future events. The following future objectives and tasks could be derived from the analysis of the flood 2002 in Austria (Flood Risk, 2004).

#### Identify the limits of protection and the responsibility of the parties concerned

The limits of protection and the responsibility of the parties concerned must be clearly defined. Damage mitigation is a community interest that requires a cooperative effort. Flood control concerns everybody.

#### Promoting knowledge and awareness

Awareness means recognizing and understanding the threat, not forgetting or suppressing it, and giving it adequate consideration in all actions.

#### Ensure adequate use through spatial planning

Land use must be adapted to a location and its properties, not the location to a particular type of use. Floodplains are intended for retention and often improve the ecological status of river landscapes.

#### Promote incentives for private precaution

Individuals can be expected to contribute in countering the risk of floods. Much could be achieved with good information and, if appropriate, suitable incentives that need not necessarily be expensive.

#### Recognise flood-relevant negative trends

Hidden trends are often not seen as a problem until a trend reversal is either technically difficult to achieve or economically unfeasible. Process-oriented preventive measures permit timely counter-action against such trends.

#### Coordinate planning by the public authorities

In many cases, conflict of interests can be avoided by coordinating all relevant planning activities. Here, the departments of the federal and provincial governments must set an example.

#### Take necessary measures of protection

Protective structures can protect existing settlements only if they are properly maintained, checked regularly for their efficiency, and updated accordingly.

#### Emergency planning and preparation of measures for disaster protection

Just as fire protection cannot replace the fire brigade, protective structures cannot replace emergency planning. Even the most extensive flood control measures cannot guarantee absolute safety. It will always be necessary to boost the efficiency of such measures with provisions for emergency planning and disaster protection.

#### Provide for funds, insurance and claims settlement

Nature is not immune to disasters and responds with quick regeneration. Humans should also make provisions for reconstruction based on savings, insurance, and public or private funds.

#### Conclusions and Expectations

The above mentioned strategies for integrated flood management leads to following conclusions and expectations.

Flood maps and the knowledge of hazard zones are the basis of integrated flood management. Flood maps are therefore the basis for ...

- implementation of appropriate land use
- reactivation and optimization of retention areas
- knowledge of hazards and to enhance risk awareness
- local structure measures & promoting individual precautions
- damage assessment and risk analysis
- emergency planning and individual precautions
- designing of integrated measures and validating of measures

The implementation of a new flood directive for Europe is necessary for a harmonized, efficient and effective integrated flood management to meet the changing challenges in future and to reduce public and private damages.

#### *MSc Minna Johanna Hanski - Ministry of Agriculture and Forestry (FI)*

#### “Nordic region – response Finland”

The three Nordic countries - Finland, Sweden and Norway - comprise a wide range of geomorphological conditions: anything from flat lake areas of Finland to Norwegian mountains. There are numerous reasons and interests behind the long history of Nordic co-operation. Flood risk management is not an exception.

Because of the cold climate a considerable part of the precipitation is snowfall. Spring floods are typical for the whole area. Rivers have thick ice cover in winter. The prevention of ice jams is a challenging task. Ice booms are used to prevent frazil ice problems in rivers during freeze-up, ice saws are used to cut ice cover before break-up to prevent ice jam formation, and excavators and blasting are used to break and remove ice jams. However, often the most effective method to prevent ice problems in Finland is river discharge regulation.

In Finland there have been no disastrous floods for over 100 years. Sweden and Norway are more mountainous and have not been so fortunate. However, during 2000s the scale of damages has been minor in all three countries compared to the disastrous floods in Central Europe. This is mostly because of favourable climatic and geomorphological conditions. The abundance of lakes and marshlands increase the retention capacity of many Finnish and Swedish water bodies. Dams, hydropower plants and related structures have an important role in managing flood discharges in Finland and Norway.

Climate change is a great challenge for the Nordic countries as well. The seasonal distribution of runoff is expected to change. Extreme runoff events are projected to be more frequent due to increased maximum precipitation. Winter seasons will be shorter, spring floods lower and autumn and winter floods more abundant. This means that flood forecasting and optimal multi-objective use of flow regulation will become even more challenging tasks in the future. Alterations in ice conditions may also increase the challenges of flood risk management.

The large number of river basins and small population (taxpayers) is a combination which can make the implementation of the Floods Directive expensive for Nordic countries. This is why the preliminary flood risk assessment is especially important. The preparation of the directive has moved into the right direction as it gives Member States a lot of flexibility and we can concentrate our efforts on areas where significant flood risk exists.

*Dr. Thomas Hlatky (GraWe/CEA)*

“Floods and the insurance services”

The CEA is the Federation of European insurance associations dedicated at promoting insurance markets and issues in all debates with European institutions. Natural catastrophe insurance is now at the forefront of insurance industries concerns in Europe.

CEA presentation is split into three parts: the first two provide factual background elements which explain the third one.

Part one contains specific features of EU-context. In part two, you will get some insights of our increasing cooperation and experience-sharing activities. Part three consists of CEA's position on PPP in Europe. Current situation for natural catastrophe coverage is shown as well in some details.

Main purpose of CEA's work focuses in encouraging flood prevention, more sophisticated land use planning, risk zoning and mapping and preparing insurance solutions.

### 18<sup>th</sup> May 2006 , Session 3

“Flood risk management in large river basins; implementation of programmes”

*Prof. Ph.D. Piotr Kowalczak - Institute of Meteorology and Water Management (PL)*

“Flood risk management in the Odra basin”

The presentation gives a general overview of flood at the Odra River basin with a special emphasis on the biggest flood ever recorded in 1997. Further, it discusses the main directions and the most important aims of "Action Programme for Flood Protection in the Odra River Basin" - the document of the International Commission for the Protection of the Odra River against Pollution (ICPOaP). This document is the basis for the common flood protection action of Czech Republic, Poland and Germany within the Odra River basin.

*Dr. Anne Schulte-Wülwer-Leidig (IKSR)*

“Rhine Basin – flood action plan”

#### 1. Introduction

For many centuries the river Rhine has played an important role in the history and the social, political and economic development of Europe. The multiple use of the river, the conflicting interests and especially the environmental and flood problems in and alongside the river, have shown the importance of an integrated approach for solving and preventing problems with the Rhine and its waters.

The International Commission for the Protection of the Rhine (ICPR) was established in 1950 as the first intergovernmental body for the management of transboundary waters. Within the ICPR, Switzerland, France, Germany, Luxembourg and the Netherlands closely co-operate, the European Economic Community joined this co-operation in the field of water policy in 1976.

In its more than 50 years of existence, the Rhine Commission has gained a lot of experience in dealing with a broad range of river problems. The international management of the Rhine has continuously developed and is still developing. For example, the Rhine Commission activities lead to further developments on the EU level, such as the Water Framework Directive in December 2000 and the now discussed Directive Proposal on the assessment and management of floods. The directives strengthened the importance of river basin commissions in Europe, due to the obligation for Member

States to coordinate work within international river basin districts. All these developments may be seen as a fruitful output from many interactive processes in river commissions, their Member States and on the European level.

## 2. The ICPR Action Plan on Floods

Flood problems are as old as the river itself, but human activities in and along the River Rhine have strengthened the negative impact of floods during the last two centuries. Changes in the course of the river and the riverbed, the increased use of the whole river basin, erosion, urbanisation and changes in the water management seriously increased the risk of flooding in the Rhine area. At the same time, more and more people and economic activities settled in flood risk areas, thus increasing the potential damage resulting from floods.

The 1993 and 1995 floods in the middle and lower Rhine clearly showed the need for a drastic change in both river management with respect to floods and the risk management policies in potentially endangered areas. Some years later, the very same problems were experienced in almost all large European river basins. The latest extreme floods were registered last month in almost the entire watersheds of the Elbe and the Danube.

In 1998, following the great floods of the rivers Rhine and Maas which occurred in 1993 and 1995 and based on a special mandate of the European Ministers of Environment, the International Commission on the Protection of the Rhine (ICPR) drafted the **Action Plan on Floods**.

The main targets of the Action Plan on Floods are to distinctly reduce extreme flood levels by up to 70 cm and flood related damage by up to 25% by 2020. The phased action plan will be implemented in the Rhine bordering countries by 2020 at a cost of some 12,3 billion Euro. Different measures aim at increasing water retention in the watershed and along the Rhine, e.g. by reactivating flood areas creating more room for the Rhine, by creating new retention areas behind the dikes, by measures of nature restoration, de-intensification of agriculture and forest development. Measures aimed at reducing the damage relate to designating flood areas and keeping them open or only admitting such uses which are adapted to floods, to improving flood announcement and doubling forecast lead time, etc. An extensive bundle of measures protecting human health and property against flood damage or minimising such damage is to be implemented by 2020. Taking into account sustainable Rhine policy, ecological deficits are to be compensated at the same time.

## 3. Implementation of the Action Plan on Floods – present state

There was a first stock taking with respect to the implementation of the Plan in the beginning of 2001. Within the IRMA programme, the ICPR has drafted a first **Rhine Atlas on the danger of floods and damages likely to occur during extreme floods**. The atlas which may be downloaded from [www.iksr.org](http://www.iksr.org) points out the likely damage potential to the public as well as to experts. Such maps illustrating the risks (worst case scenario) are a means of visualizing how floods endanger human health and property. The evaluation of possible damage varies between 38 million € on the High Rhine, about 12 billion on the Upper Rhine, 1.7 billion along the Middle Rhine, some 20 billion € along the Lower Rhine and 131 billion € in the Rhine delta. The Rhine atlas may serve as a model for other rivers and incite the drafting of more precise regional or municipal maps. It is equally the basis for the proposed 25 % reduction of the damage potential along the Rhine by 2020. A further means is doubling the forecast lead time by 2005. In mid 2002, the ICPR presented guidelines for the measures aimed at reducing damage potentials and for their effectiveness and recommended that the states implement them. **Land use control, flood proofing constructions, flood preparedness and emergency planning** are key words for controlling the damage potential. The knowledge about the interconnection of these fields exists, it must now be translated into local measures by 2020.

Today we are preparing the reporting with respect to the implementation of the Action Plan on Floods by 2005. It will be the basis for new decisions during the planned Rhine Ministers' Conference, which will be held in spring 2007 in Germany (Bonn). It is obvious that parts, but only parts, of the targets will have been achieved by 2005.

Dr. Igor Liska (ICPDR)

“Flood risk management in the Danube River Basin”

### The ICPDR

The Danube River Protection Convention forms the overall legal instrument for cooperation and transboundary water management in the Danube River Basin. The main objective of the convention is the sustainable and equitable use of surface waters and groundwater and includes management of flood risks. To implement the objectives of the Convention the Danube countries have established the International Commission for the Protection of the Danube River (ICPDR). The Contracting Parties agreed that the ICPDR should serve as a common platform for the implementation of the EU WFD on a basin-wide scale.

### Flood Action Programme

In response to the danger of flooding and in line with its Joint Action Programme, the ICPDR decided in 2000 to establish the long-term Action Programme for Sustainable Flood Prevention in the Danube River Basin. The whole process was accelerated after disastrous floods in 2002 and resulted in adoption of the Action Programme at the ICPDR Ministerial Meeting on 13 December 2004.

This Action Programme is based on the sustainable flood protection programmes developed in the various Danube countries as well as on networking existing structures and using the future-oriented knowledge base accumulated through a wide range of activities over the past decade. The overall goal of the Action Programme is to achieve a long term and sustainable approach for managing the risks of floods to protect human life and property, while encouraging conservation and improvement of water related ecosystems. Given the area, the complexity and the internal differences in the Danube River Basin, the Action Programme represents an overall framework, which needs to be specified in further detail for sub-basins.

The Action Programme is based on UN-ECE Guidelines on Sustainable Flood Prevention, EU Best Practices on Flood Prevention, Protection and Mitigation and on EU Communication on flood risk management, COM(2004)472. The major principles advocated are: (i) the shift from defensive action against hazards to management of the risk and living with floods (ii) the river basin approach taking into account the Water Framework Directive, (iii) joint action of government, municipalities and stakeholders towards flood risk management and awareness raising, (iv) reduction of flood risks via natural retention, structural flood protection and hazard reduction, and (v) solidarity.

Targets of the Action Programme are set on a basin-wide and a sub-basin level taking into account the above-mentioned principles. There are four major basin-wide targets, which are currently under implementation.

#### *(i) Improvement of flood forecasting and early flood warning system*

Interlinking of the national and/or regional systems aims to improve the overall coordination and transboundary coherence of flood monitoring and forecasting systems. A Danube Flood Alert System based on the LISFLOOD model is under preparation by the EC JRC in Ispra

#### *(ii) Support for the preparation of and coordination between sub-basin-wide flood action plans*

The ICPDR is a coordination platform for preparation of flood action plans for the river sub-basins. Linking of flood risk management with the river basin management is under consideration by the ICPDR.

#### *(iii) Creating forums for exchange of expert knowledge*

Measures should be taken towards sharing of experience and the coordinated development and promotion of best practices on flood risk management. Exchange of relevant information on flood protection, prevention and mitigation with the other international river commissions is foreseen.

#### *(iv) Recommendation for a common approach in assessment of flood-prone areas and evaluation of flood risk*

The overall approach of the proposed EU Flood Directive to flood risk mapping is coherent with the basic principles as described in the ICPDR Flood Action Programme. At present the status report on flood mapping and flood risk evaluation in the Danube River Basin is being prepared in cooperation with the EEA. The common approaches for flood risk mapping will be developed utilizing also the outcomes of the research cooperation at the EU level (EXCIMAP).

### EU Flood Directive

The ICPDR experts participated actively in preparation of the EU Flood Directive and the incorporation of the relevant provisions of this Directive is foreseen in the Action Programme for Sustainable Flood

Prevention in the Danube River Basin. The ICPDR Flood Protection Expert Group started the analysis of the EU Flood Directive in light of the revision necessity of the ICPDR flood protection policy. The analysis should lead to a draft of a transformation scenario for convergence of the ICPDR Flood Action Programme with the EU Directive.

#### 18<sup>th</sup> May 2006, Session 4

##### **Lessons learnt: risk zone mapping, planning and implementation of programmes**

*Ph.D. Eng. Madalin Mihailovici (RO)*

“Romania - Lessons learnt, response foreseen”

The presentation begins with an explicit scheme of informational flow in case of disaster and the inter-institutional cooperation for specific floods management.

The vulnerability degree of Romanian counties in 1992-2004 from damages point of view is presented on a country map on four categories (very high, high, medium and low) together with maximum flows on Romanian territory (the repartition of water quantities on basins catchments). A comprehensive history of flooding periods have been developed making large description of first flooding period in Banat region (April 2005) with evacuated localities, in Lower Olt hydrographic basin and Arges-Vedea (June 8-18, 2005), on Trotus Valley underlying the zone with massive deforestation which coincide with the peak forming zone (maximum registered precipitation, over 200 l/sqm), in Ialomita and Arges-Vedea hydrographic basins (September 17-29, 2005) and the manner of peak flow mitigation upstream of Bucharest.

After massive flooding events the learned lessons are: necessity of a stronger cooperation between all “actors” in flood defence, the need of different disaster scenarios, flood risk mapping, use of railroads and roads as second flood defence line, more specific bilateral agreements between countries and common projects; new law for small reservoirs (especially for fish-ponds)/Governmental Decision 138/2005, coordination of all hydraulic infrastructures at river basin level, estimation of new importance class of hydraulic structures, coincidence of bad events in water management, necessity of an integrated approach at river basin level, a new communication system for different stakeholders, a modern monitoring system (DESWAT, different local projects), flooding risk maps, re-evaluation of transit capacity between dikes or polders for establishing the real capacity.

After the recent events (april-mai 2006) on the Danube (shortly presented), impose the necessity to re-evaluate and design a new strategy for flood defence downstream of Danube river basin (including Danube Delta) taking into consideration new wetlands, polders and ecological reconstruction of former water branches.

*Dipl.-Bauing. Dr. Gian Reto Bezzola - Federal Office for the Environment (CH)*

“Switzerland – Lessons learnt, actions taken”

In recent decades, stream and river training have contributed much to the general economic development of many areas in Switzerland. Only in recent years has flood protection policy been updated. For a new way of flood risk assessment, the year 1987 has become a milestone. The 1987 flood disasters showed that there is no absolute safety from floods and triggered a complete review of flood protection policy. The analysis these events led to the conclusion that a sustainable policy requires land-use practices that take account of existing natural hazards and minimize direct impacts on rivers and streams. This is possible only when sufficient consideration is given to the multitude of functions fulfilled by rivers and streams. Therefore, a modern flood protection policy will not only take account of safety aspects but consider other aspects of sustainable development such as environmental concerns and economic factors.

Two main strategies must be pursued to prevent an exponential increase of flood damage in the future: (i) priority has to be given to land-use planning in order to reduce vulnerability and damage potential, and (ii) emergency planning to reduce flood damages is crucial.

The recent Federal Law on Flood Control (1991) provides a new basis for hazard assessment, differentiation of protection objectives, adequate planning of measures and limitation of remaining risks (emergency planning). The respective Ordinance on Flood Control revised in 1999, regulates these general considerations.

The federal law on flood protection determines priority among respective measures. Sustainable measures have a clear priority. Flood protection is to be guaranteed through **proper maintenance** of the river or stream channel. This also includes the maintenance of **forests** with a protective function throughout the entire catchment. **Land-use planning measures** to preserve open space along rivers and prevent uncontrollable increase of damage potential on floodplains have the same priority as maintenance of river channels. **Structural measures** are only to be considered when maintenance work and planning measures cannot provide the necessary safety. Determination of priorities requires consideration of other measures such as **flood-proofing of buildings** and other existing structures.

Residual risks always remain. These residual risks must therefore be assessed and the planned measures supplemented by **emergency planning** and related **emergency organization** (including warning concepts and evacuation plans). The efficacy of the measures in place needs to be examined in case of **overstress** during extreme events. This integral examination leads to living being conscious of possible hazards in the sense of a global risk culture.

The August 2005 floods represent the first “practical” test for the new flood protection policy. It proved to be successful wherever projects based on the new strategy had already been implemented. In these cases, much large damages have apparently been prevented.

*Thomas Stratenwerth / Hans-Peter Ewens (DE)*

“Germany – Lessons learnt, actions taken”

In reaction to the extreme flood events in the Danube and Elbe basins in the year 2002 the Federal Government launched the so called 5-Issue Programme in autumn 2002. The programme consists of five major elements:

- Joint Flood Protection Programme of Federal Government and Federal States
- Flood Action Plans co-ordinated across administrative (and national) boundaries
- Promoting European Cooperation
- Review of construction plans for inland navigation, environmentally sound development of navigation
- Immediate and short term actions (Recovery Fund)

The main principles underlying the Joint Flood Protection Programme resulted were

- Space for rivers
- Decentral Retention of Water in the Catchment Areas
- Reduction of potential damage through management of settlement development and spatial planning

Flood management plans have been developed for all major international and national river basins complemented by regional and local plans and concepts. The objectives to reduce damage potential and to ensure a sufficient level of protection for the population, economic activities and the environment and measures such as

- improving forecast and early warning systems,
- awareness raising and information (rules for behavior),
- risk Mapping,
- improvement of natural retention, renaturation of floodplains,

- technical protection measures (but also dyke relocation),
- prevention through land use management, requirements to reduce risk and damage potential

can be identified as common elements of these plans.

In 2005 a new flood protection act came into force introducing stricter and more precise provisions for flood protection and flood management to be applied throughout Germany.

The German Government has been supportive to the activities initiated by the EU Water Directors leading to the best practice document on flood management as well as to the Council Conclusions from October 2004 calling upon the European Commission to develop a proposal for an European Action Programme on Flood Management including a legal instrument. The German Government affirms the overall approach of the proposed directive on flood risk management and welcomes the progress achieved by the Austrian Presidency in the negotiations preparing a possible decision by the Council on a Political Agreement in June. However there are some essentials Germany wishes to be better reflected in the proposal going to Council as a condition for a positive vote.

### 18<sup>th</sup> May 2006, Session 5

#### “The European response to the challenge of floods”

*Dr. Guido Schmuck / Dr. Ad de Roo (JRC)*

#### “Research and Flood Risk Forecasting; first results and further developments”

The Joint Research Centre (JRC) provides policy support on flood issues, especially focused on cross-border river basins. Besides the work of the development of an early warning system (EFAS (the European Flood Alert System), JRC carries out flood mitigation and forecasting case studies in the Elbe and Danube, flash floods and climate change effects and flood risk mapping.

The presentation will focus on ongoing research on floods at the JRC, and will cover:

- Early warning
  - European Flood Alert System (EFAS), showing examples of EFAS warnings in August 2005 and March/April 2006
    - Co-chairing the EXCIFF flood forecasting exchange circle
    - Support to the IKSE and ICPDR flood action plans
- Raising awareness:
  - Informing about current risk:
    - Flood Risk Mapping at pan-European scale
    - Support to DG REGIO and EU Directive on flood risk management
  - Informing about future risk:
    - Effects of climate change on extreme floods and droughts: assessment at pan-European scale
    - Changing vulnerability and exposure (land use change studies)
      - Support to DG ENV (climate change adaptation), DG REGIO (regional planning) and EEA
- Prevention

Scenarios of prevention measures at river-basin scale (Elbe & Oder)

Support to International River Basin Commissions (IKSE, IKSO)

*Prof. Paul Samuels (FLOODsite Coordinator)*

“Flood risk Analysis and Management – achieving benefits from research”

This short paper considers two examples of potentially deriving greater benefit from expenditure on research on flood risk management. Both examples come from current EU funded projects in the Sixth Framework Programme. The FLOODsite Integrated Project is undertaking research into integrated flood risk analysis and management methodologies. The EC project stops short of implementation and uptake into practice of the research outputs, which are critical to deriving lasting public benefit from the advances in knowledge and understanding created in the project. The FLOODsite team has recognised this and has produced a Communication and Dissemination Plan to guide better the transfer of the research to end-users. In addition, the Coordinator has established close links with stakeholders as part of a planned integration of the research into national practice in the UK. The second example project is the Coordination Action **CRUE** which forms part of the ERA-NET programme. **CRUE** approaches the delivery of greater benefit from research expenditure from a different perspective, the closer collaboration and cooperation between the national funding programmes for research. This has already led to a common call for research funded from several Member States' national programmes. The expected outcome of the activities on the process of research commissioning and management and dissemination of the research outputs should bring long-lasting benefits to all the Partners in the ERA-NET. The ultimate goal of **CRUE** is to establish an enduring programme of research collaboration and integration beyond the network funding.

*Frédérique Martini - Ministère de l'écologie et du développement durable (FR)*

“The European Network of Expertise – Flood risk forecasting and mapping”

When they agreed on publishing the guide « Best practices in flood prevention, protection and mitigation » in June 2003, the European union water Directors acknowledged the need to share a common culture on mitigating flood risk in Europe. They identified the need for exchange of experience and know-ledge between European countries in flood management. Setting European exchange circles on different topics consisting the flood management has been encouraged to cover this need.

Thus, coming from an initiative of DG-JRC and France, a first European exchange circle focusing on flood forecasting (EXCIFF) has been working for 18 months now. EXCIFF is producing valuable reviews and exchange of knowledge.

A second European exchange circle addressing flood mapping (EXCIMAP) has been launched in early 2006, by Swiss confederation and France. EXCIMAP aims at publishing a guide of good practices supporting the Member states for carrying out flood mapping in their countries. And some other exchange circles are in preparation and will enlarge the range of subjects under consideration.

These European exchange circles naturally find their place in the European action programme on flood, by facilitating the exchange of information in Europe. They can also usefully support the Member states in the implementation of this European action programme.

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“Presentation of legislative Proposal of the Floods Directive and funding instruments”

Abstract not yet delivered